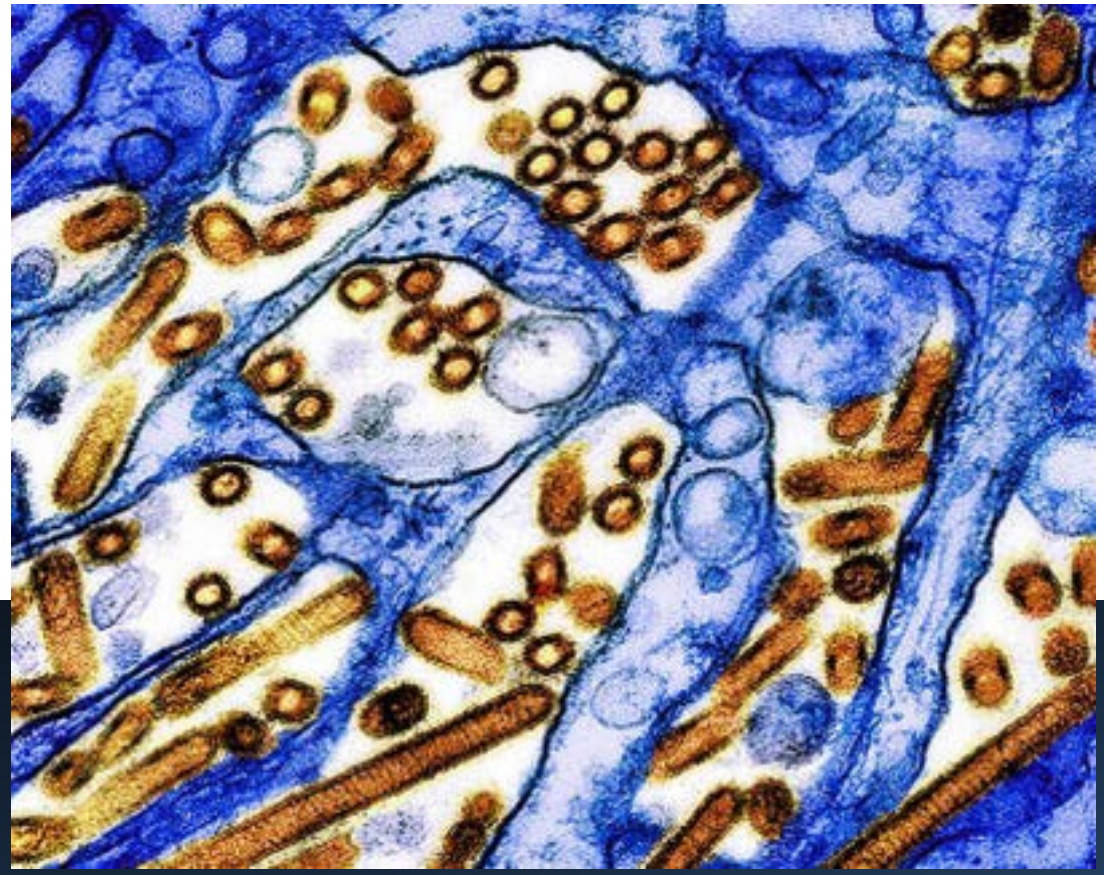
Highly Pathogenic Avian Influenza A
AKA HPAI
~AKA H5N1



CDC & NIAID

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Conflicts of Interest

- No conflicts to disclose

H5N1: Historical Perspective

Subtype of Influenza A virus

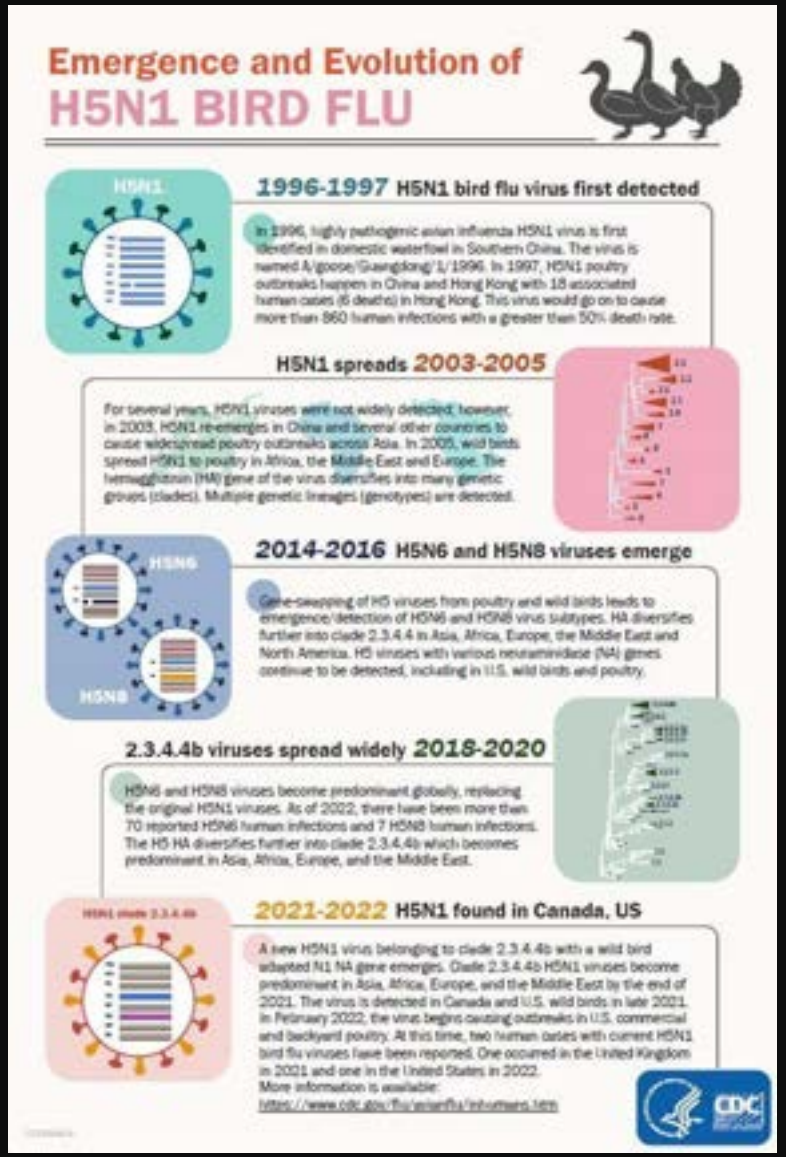
Virus itself is not new

- First recognized in China in mid-90's in domestic waterfowl

Initially associated with poultry outbreaks w/high mortality

Like other Influenza A viruses, has evolved over time

- Facilitated spread to other continents



Human Infections

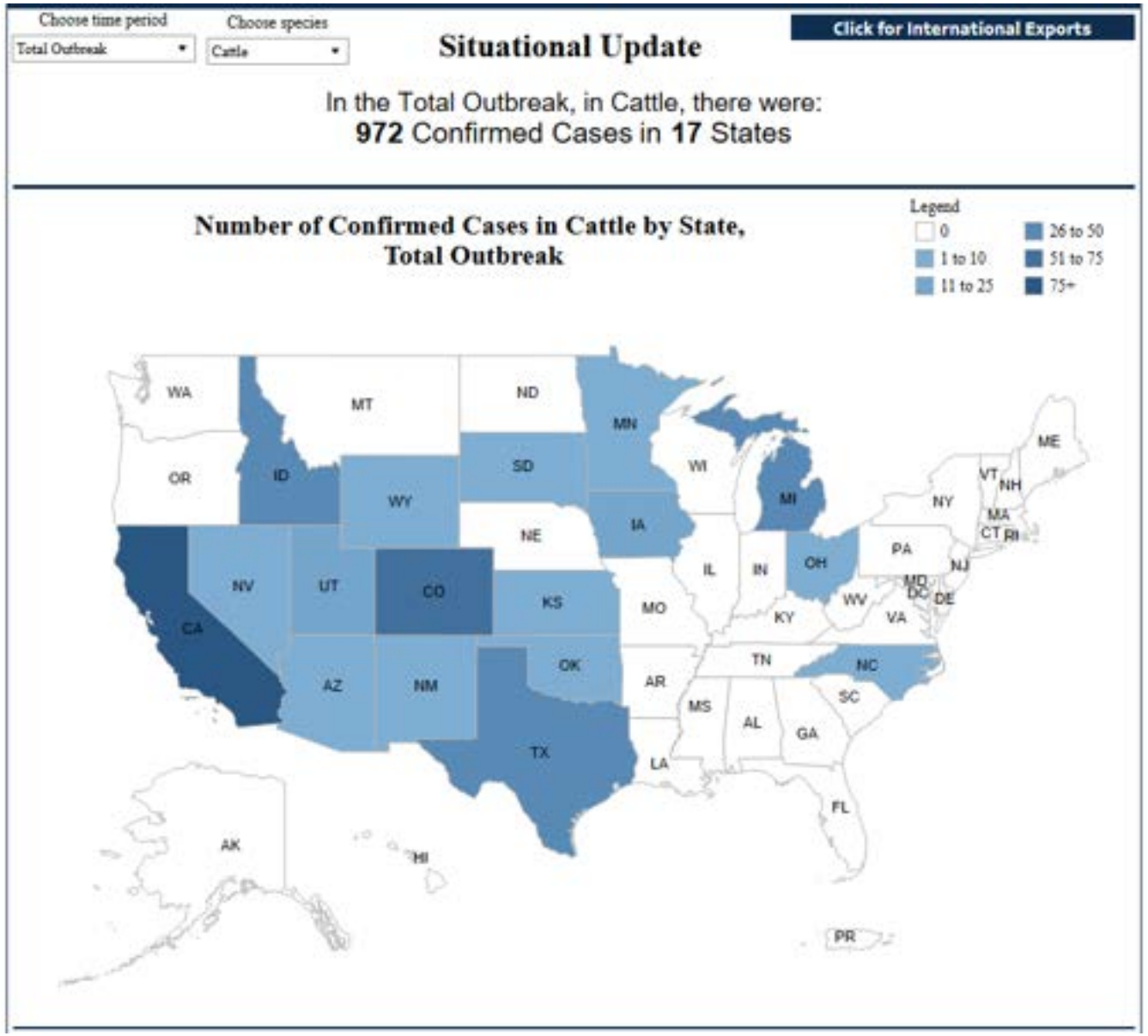
- Sporadic cases in humans since 1997
- Receptors predominantly located in LRT, also conjunctiva
- Majority w/direct (unprotected) or close exposure to infected animals (mostly poultry)
  - Few cases of limited human-to-human transmission after prolonged exposure (last reported 2007)
- Clinical presentation very similar to other Influenza A strains, but more severe

H5N1: Contemporary Events

- Clade 2.3.4.4b emerges in 2020 in wild birds --> global spread --> detected in US and Canda by end of 2021
  - Now detected in commercial, domestic and/or wild birds in all 50 states
- **2024: detection in livestock including dairy cattle**

H5N1 in Dairy Cattle

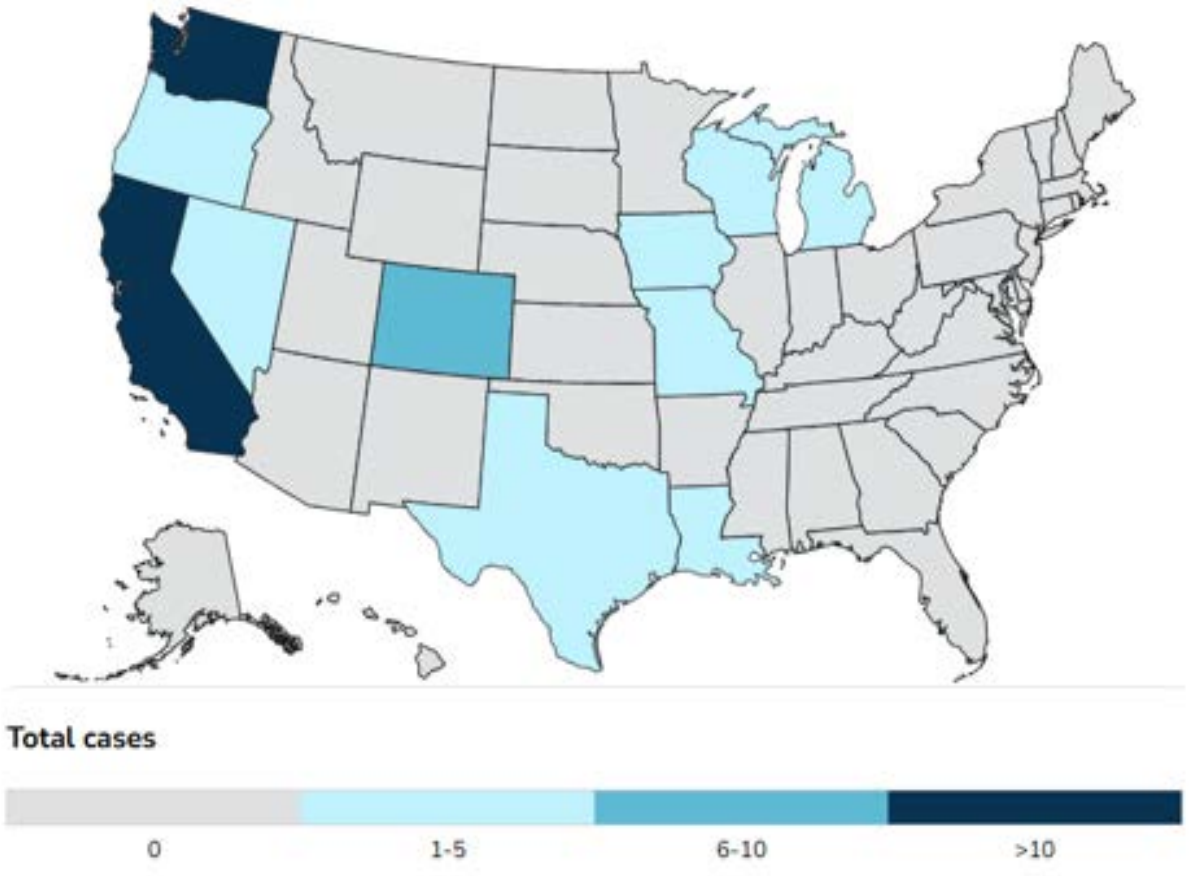
- Not fatal
- Symptoms range from asymptomatic to anorexia, decreased milk production
- High levels of virus in **raw** milk
- Other animals associated with these outbreaks



USDA

Human Infections in US

- 68 confirmed cases since start of outbreak
- Transmission:
  - Majority with dairy cattle or poultry farm exposure
  - No human-to-human transmission



CDC

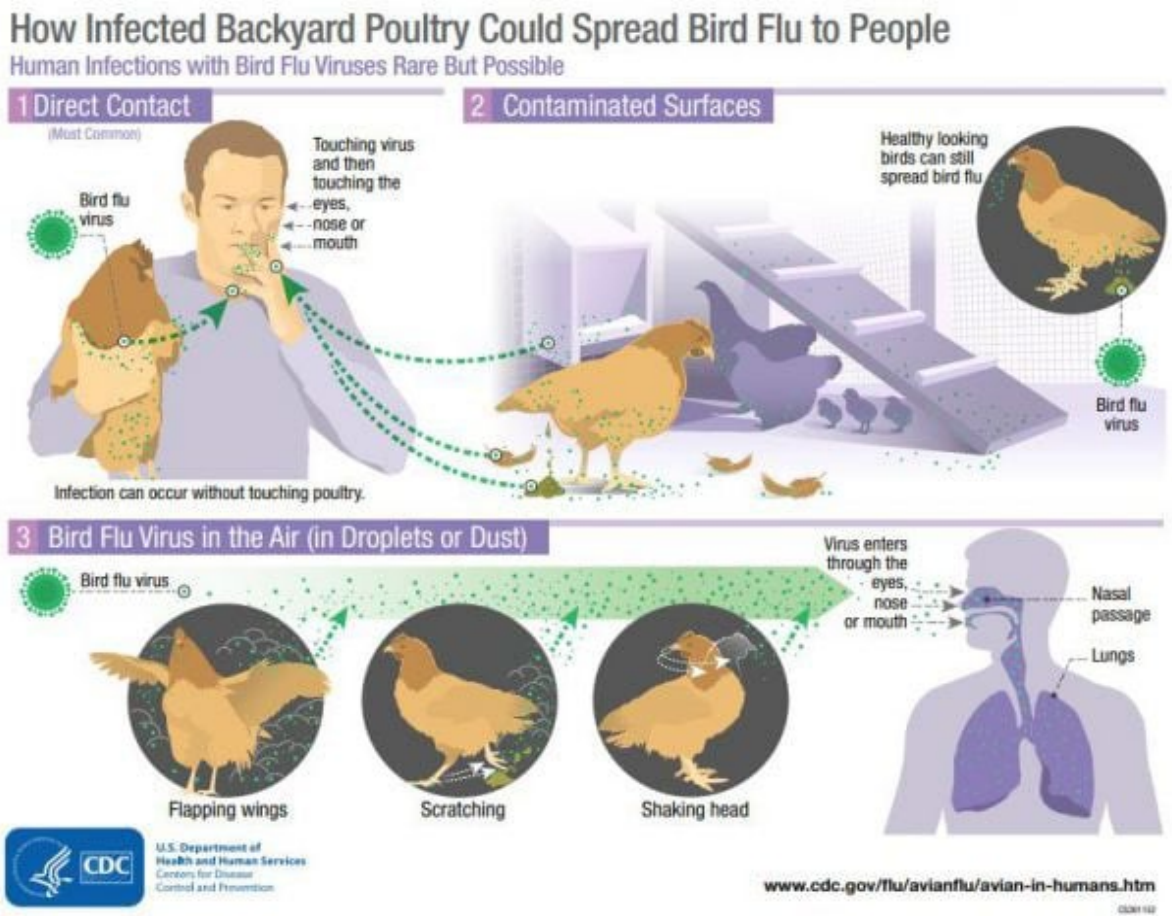
Human Infections in US

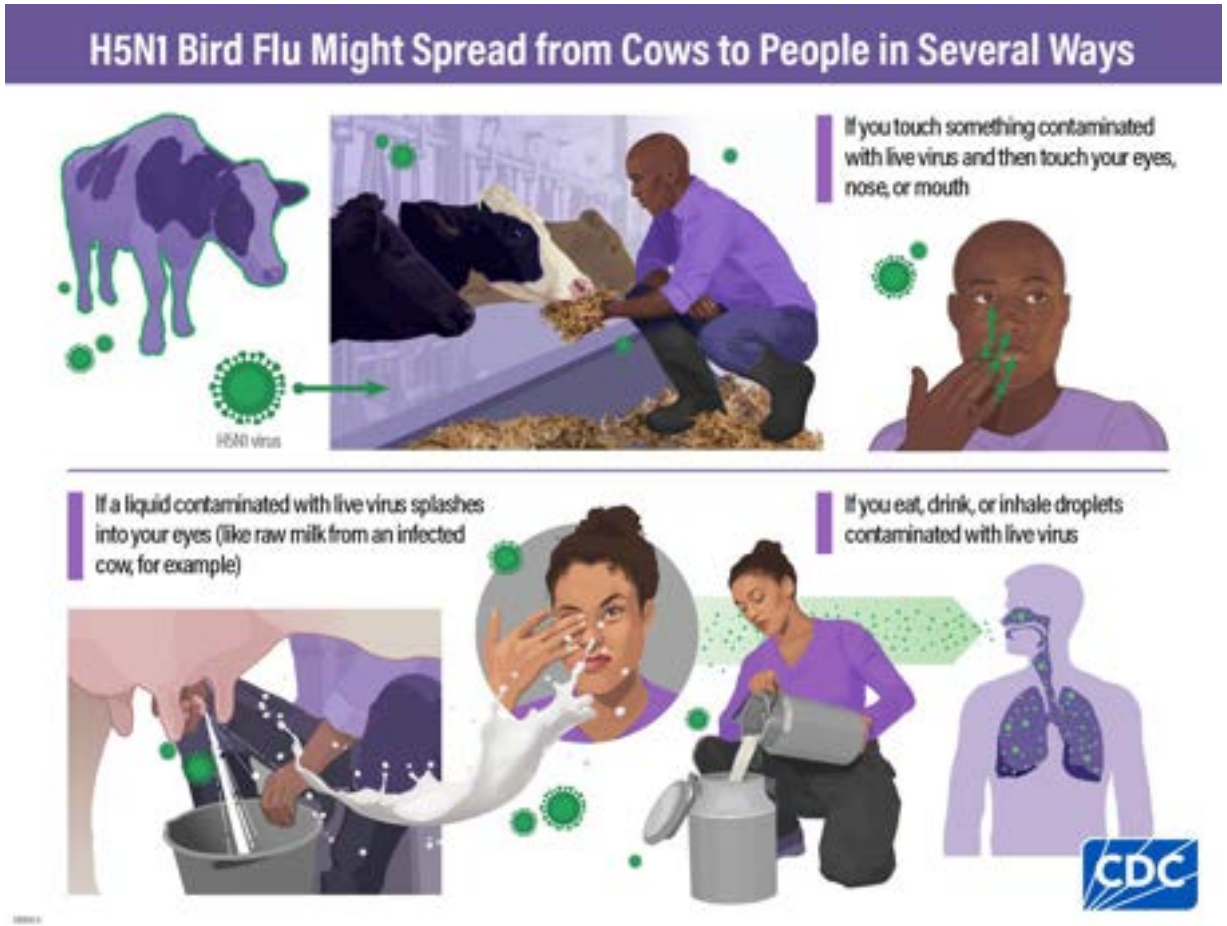
- Clinical presentation:
  - Majority mild
  - Conjunctivitis common
  - 1 fatality

Table 2. Clinical Characteristics of and Outcomes in 45 Case Patients with Highly Pathogenic Avian Influenza A(H5N1) Virus Infection Who Had Exposure to Infected Animals.*

Variable	Exposure to Poultry (N = 20)	Exposure to Dairy Cows (N = 25)	Overall (N = 45)
Signs and symptoms			
Conjunctivitis — no. (%)	19 (95)	23 (92)	42 (93)
Measured fever or feeling feverish — no. (%)	12 (60)	10 (40)	22 (49)
Respiratory symptoms — no. (%)†	9 (45)	7 (28)	16 (36)
Cough	3 (15)	5 (20)	8 (18)
Sore throat	7 (35)	6 (24)	13 (29)
Shortness of breath	3 (15)	4 (16)	7 (16)
Myalgia — no. (%)	11 (55)	8 (32)	19 (42)
Headache — no. (%)	11 (55)	9 (36)	20 (44)
Fatigue — no. (%)	6 (30)	4 (16)	10 (22)
Nausea — no. (%)	6 (30)	0	6 (13)
Vomiting — no. (%)	1 (5)	1 (4)	2 (4)
Diarrhea — no. (%)	2 (10)	0	2 (4)
Clinical constellations			
Status with respect to conjunctivitis — no. (%)			
Conjunctivitis only	4 (20)	11 (44)	15 (33)
Conjunctivitis plus any respiratory symptom	8 (40)	6 (24)	14 (31)
Conjunctivitis plus any nonrespiratory symptom	7 (35)	6 (24)	13 (29)
Only nonconjunctival symptoms	1 (5)	2 (8)	3 (7)
Symptoms still present at time of interview — no. (%)	2 (10)	7 (28)	9 (20)
Median no. of days with symptoms (range)‡	2.0 (1.0–8.0)	5.0 (2.0–7.0)	4.0 (1.0–8.0)
Oseltamivir treatment — no. (%)	18 (90)	21 (84)	39 (87)
Median no. of days between symptom onset and treatment (range)§	1.0 (0–8.0)	2.5 (0–8.0)	2.0 (0–8.0)
Median no. of days of oseltamivir treatment (range)¶	5.0 (3.0–10.0)	5.00 (5.0–10.0)	5.0 (3.0–10.0)
Hospitalization — no.	0	0	0
Death — no.	0	0	0

Garg et al NEJM 2024


How Infected Backyard Poultry Could Spread Bird Flu to People
Human Infections with Bird Flu Viruses Rare But Possible
1 Direct Contact
(Most Common)
Bird flu virus
Touching virus and then touching the eyes, nose or mouth
Infection can occur without touching poultry.
2 Contaminated Surfaces
Healthy looking birds can still spread bird flu
Bird flu virus
3 Bird Flu Virus in the Air (in Droplets or Dust)
Bird flu virus
Flapping wings
Scratching
Shaking head
Virus enters through the eyes, nose or mouth
Nasal passage
Lungs
CDC
U.S. Department of Health and Human Services
Centers for Disease Control and Prevention
www.cdc.gov/flu/avianflu/avian-in-humans.htm

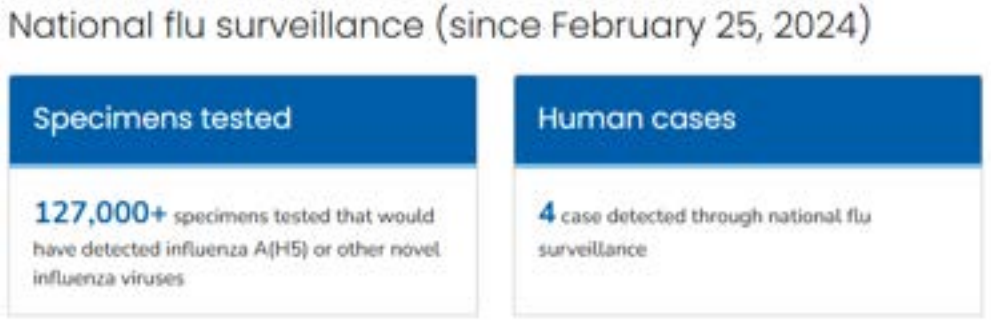

H5N1 Bird Flu Might Spread from Cows to People in Several Ways
H5N1 virus
If you touch something contaminated with live virus and then touch your eyes, nose, or mouth
If a liquid contaminated with live virus splashes into your eyes (like raw milk from an infected cow, for example)
If you eat, drink, or inhale droplets contaminated with live virus
CDC

Case Detection

- Most commercially available Influenza tests don't distinguish H5N1
- PH Authorities performing the following:

Targeted surveillance of exposed individuals

National surveillance of subset of influenza A positive specimens



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CDC HEALTH ADVISORY

Distributed via the CDC Health Alert Network
January 16, 2025, 10:00 AM ET
CDCHAN-00520

Accelerated Subtyping of Influenza A in Hospitalized Patients

Recommendations include the following:

- Rapid subtyping of all Influenza A positive specimens from *inpatients*, so that non-seasonal strains can be sent to PHL for additional testing
- Inquiring about animal / animal product exposure in patients with ILI
- Enhanced isolation precautions in the inpatient setting

Testing

- Most commercially available influenza panels only differentiate A vs B
- Some commercially available extended RVPs identify seasonal influenza A subtypes (i.e. A(H1) and A(H3)
  - Non-subtypable influenza A on these platforms *may* indicate H5 or other novel subtype
- H5 specific testing available at PHL* and multiple commercial laboratories
  - Specimen requirements vary by lab
- Implementation of HAN variable, barriers remain

Prevention: General public

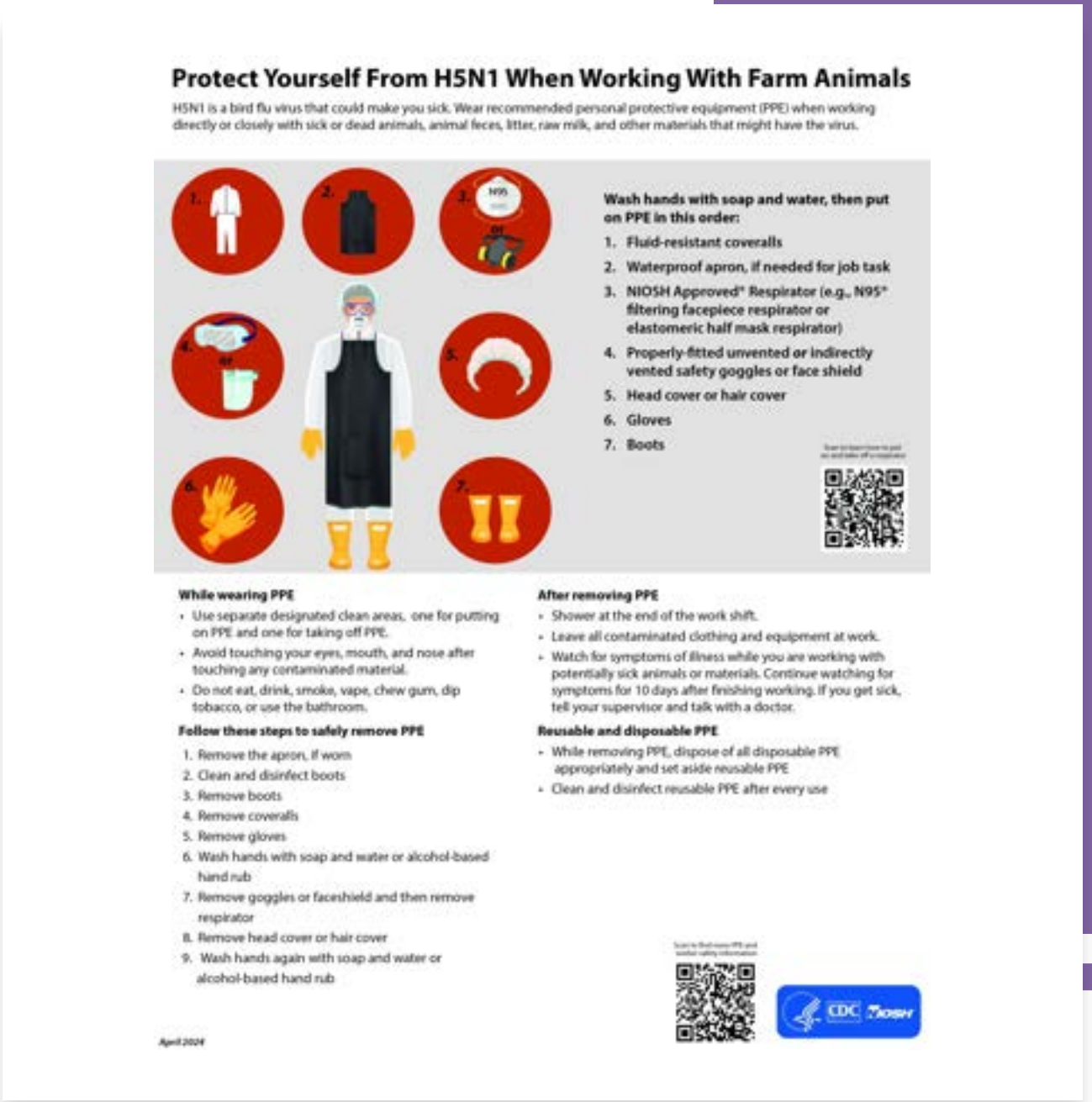
1. Don't drink raw milk

2. Avoid exposure to sick/dead animals

Prevention: Agriculture

Farm animal monitoring

Farm worker protection



Protect Yourself From H5N1 When Working With Farm Animals

H5N1 is a bird flu virus that could make you sick. Wear recommended personal protective equipment (PPE) when working directly or closely with sick or dead animals, animal feces, litter, raw milk, and other materials that might have the virus.

Wash hands with soap and water, then put on PPE in this order:

1. Fluid-resistant coveralls
2. Waterproof apron, if needed for job task
3. NIOSH Approved® Respirator (e.g., N95® filtering facepiece respirator or elastomeric half mask respirator)
4. Properly-fitted unvented or indirectly vented safety goggles or face shield
5. Head cover or hair cover
6. Gloves
7. Boots

While wearing PPE

- Use separate designated clean areas, one for putting on PPE and one for taking off PPE.
- Avoid touching your eyes, mouth, and nose after touching any contaminated material.
- Do not eat, drink, smoke, vape, chew gum, dip tobacco, or use the bathroom.

Follow these steps to safely remove PPE

1. Remove the apron, if worn
2. Clean and disinfect boots
3. Remove boots
4. Remove coveralls
5. Remove gloves
6. Wash hands with soap and water or alcohol-based hand rub
7. Remove goggles or faceshield and then remove respirator
8. Remove head cover or hair cover
9. Wash hands again with soap and water or alcohol-based hand rub

After removing PPE

- Shower at the end of the work shift.
- Leave all contaminated clothing and equipment at work.
- Watch for symptoms of illness while you are working with potentially sick animals or materials. Continue watching for symptoms for 10 days after finishing working. If you get sick, tell your supervisor and talk with a doctor.

Reusable and disposable PPE

- While removing PPE, dispose of all disposable PPE appropriately and set aside reusable PPE
- Clean and disinfect reusable PPE after every use

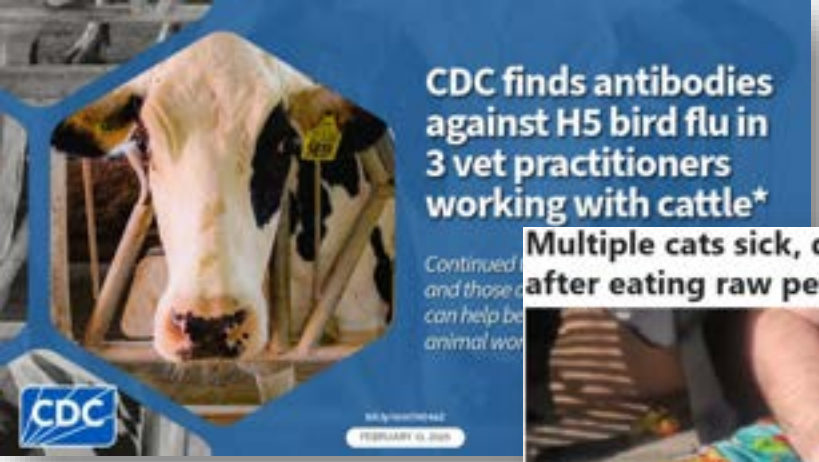
April 2024

Prevention: Healthcare Setting

- Mask symptomatic patients
- AIIR (private room with door closed if not available)
- PPE: N95 + eye protection + contact

Treatment

- Start empiric oseltamavir if clinical suspicion
  - Consider combination therapy in immunocompromised host and/or severely ill
  - Consider extending to 10d course in severely ill



Avian-flu outbreaks are curbing egg supplies around the U.S., including
PHOTO: MARK HERTZBERG/ZUMA PRESS

US gives conditional nod to Zoetis' bird flu vaccine for poultry

By Reuters

February 14, 2025 6:27 PM EST · Updated 4 days ago

Test tubes are seen labelled "Bird Flu" words in this illustration taken, June 10, 2024. REUTERS/Dado Ruvic/Illustration/File Photo Purchase Licensing Rights

Takeaways

1. **Risk of human-to-human transmission remains low**
2. **Impact on agriculture significant**
3. **Basic IP principals are the same**
   - **Identify** patients with ILI + high-risk animal exposure OR with non-subtypable influenza A
   - **Isolate** and mask patients with ILI
   - **Inform** infection prevention, PH authorities